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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,742	03/15/2004	Noboru Nakanishi	TI-34037.1	1818

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TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

KARIMY, MOHAMMAD TIMOR

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/801,742

Applicant(s)

NAKANISHI, NOBORU

Examiner

Mohammad Timor Karimy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13 and 15-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 13 and 15-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 15-20 are objected to because of the following informalities: In claims 15-20, both "A" and "The" have been crossed through. "A" should be corrected to "The" as was suggested in the office action of 7/5/06. Appropriate correction is required.

Product-by-Process Limitations

2. While not objectionable, the Office reminds Applicant that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 13,15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Bernardoni et al. (US Patent 5,278,726).

With respect to claim 13, Bernardoni et al. disclose, as shown in Figures 1-5, a semiconductor device comprising a die 12 and a substrate 14 and formed by the process of:

(a) applying an electrically non-conductive material 16 covering a least a portion of said die 12 and extending onto said substrate 14 to a plurality of contact pads 11 formed on said substrate 14 to form a layer of the non conductive material 16; and

(b) applying an electrically conductive material 13 over the non-conductive material layer 16 and extending from an electrical point of contact 18 of said die to at least one contact pad 11 on said substrate, wherein the conductive material is separated into a plurality of conductive patches (please note that Laser trimming is a product-by-Process step and it does not result to a structurally distinguishable product over the prior art).

With respect to claim 15, Bernardoni discloses in figures 1-4 the semiconductor device of claim 13, wherein a hole is trimmed into the non-conductive material layer 16 over and down to at least one bond pad (prior to placing the conductive bumps 18, a

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hole is created in the non-conductive layer 16 and subsequently the conductive bump is placed on a bond pad (not shown) on the die 12), exposing at least a portion of each bond pad to be connected.

With respect to claim 17, Bernardoni discloses in column 2 line 31, wherein the non-conductive material layer 16 comprises a non-conductive epoxy.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 16 and 18 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Arledge et al (US Patent 5,891,795).

With respect to claim 16, Bernardoni discloses the invention of claim 13 as recited in the rejection above, wherein an electrically conductive bump is formed on each said die bond pad; however, Bernardoni does not explicitly teach the conductive bump protrudes through the non-conductive and conductive material. Nonetheless, Arledge et al. teach in figures 1-4, wherein the conductive bump protrudes the conductive material 6 and non-conductive material 40 in order to provide connection to an upper circuitry. In other words, the conductive bumps will function as conductive vias providing a conduction path in a multilayer circuit (see column 2 lines 15-26).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form Bernardoni's device allowing the bump protrudes through the conductive and non-conductive material as taught by Arledge. The motivation for doing so would be to provide a conduction path.

With regard to claims 18, Bernardoni et al. discloses the invention of claim 13 as recited in the rejection above. However, Bernardoni does not disclose an non-conductive material layer comprising a non-conductive polyimide covering the substrate. Nonetheless, Arledge et al. teach the formation of a non-conductive layer (40) comprising a non-conductive polyimide covering a substrate 10 (see Figure 3 and column 3, lines 24-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form Bernardoni's device further including a non-conductive layer comprising a non-conductive polyimide covering the substrate, such as taught by Arledge in order to protect the substrate from external contamination.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Crowley et al. (US Patent 6,707,138 B2).

With respect to claim 19, Bernardoni discloses the invention of claim 13 as recited in the rejection above; however, Bernardoni does not teach the conductive layer comprising of conductive ink. Nonetheless, Crowley teaches an electrical layer comprising of conductive ink in figures 4-5 and column 4 lines 51-54 for conduction. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

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invention was made to use conductive ink in Bernardoni's conductive layer as taught by Crowley to provide conduction.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Munshi (US Patent 6,718,628 B2).

With respect to claim 20, Bernardoni discloses the invention of claim 13 as recited in the rejection above; however, Bernardoni does not teach the conductive layer comprising of metal ion coating. Nonetheless, Munshi teaches a conductive material layer comprising metal ion coating in column 12 lines 16-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use metal ion coating in Bernardoni's conductive layer as taught by Munshi in order to provide protection from oxidation and enhance conduction.

Response to Arguments

10. Applicant's arguments filed 8/24/2006 have been fully considered but they are not persuasive. Applicant claims that laser trimming results to a new and non-obvious product as compared with the prior art's photolithographic procedure. Applicant argues that the prior art's photolithographic procedure has physical constraints to allow close spacing of conductors. Applicant maintains that laser trimming may be made highly precise to permit very close spacing of conductors.

Examiner takes notes of applicant's arguments, but do not find them persuasive for the following reasons: Applicant fails to prove that laser trimming necessarily result

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to a different structure than the prior art. Moreover, It is possible to form close spacing of conductors by using photolithography as well. One could etch out very small portions of metal conductors in order to establish close spacing. Or one could obtain close spacing of conductors by etching an oxide layer on a substrate, depositing a metal layer on the etched portion and then applying insulative material to function as a very narrow barrier between the metal conductors. While one could obtain closer spacing through photolithography, the final structure as reflected in the claims does not necessitate a smaller dimension for spacing of the conductors by photolithography.

Furthermore, applicant has not addressed any specified dimensions in the claims as to how precisely close conductors are spaced using laser trimming procedure. In addition, having only closer spacing of conductors does not result to a patentably distinct structure. As such applicant's arguments remain unpersuasive.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Timor Karimy whose telephone number is 571-272-2006. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

mtk



KENNETH PARKER
SUPERVISORY PATENT EXAMINER